SPW2. Contaminant Accumulation in Fish, Sediments, and the Aquatic Food Chain

Progress Summary

August 27, 2003

Jerry Boles
Northern District
California Department of Water Resources

SPW2. Contaminant Accumulation in Fish, Sediments, and the Aquatic Food Chain

- Study Objectives
  - Determine the magnitude and extent of bioaccumulation of metals and organic contaminants in aquatic organisms within the project-affected area
  - Determine the sources and potential pathways of contamination that contribute to bioaccumulation including contaminated sediments deposited as a result of project features, operations, and maintenance
  - Provide information that could be used to develop potential protection, mitigation and enhancement measures

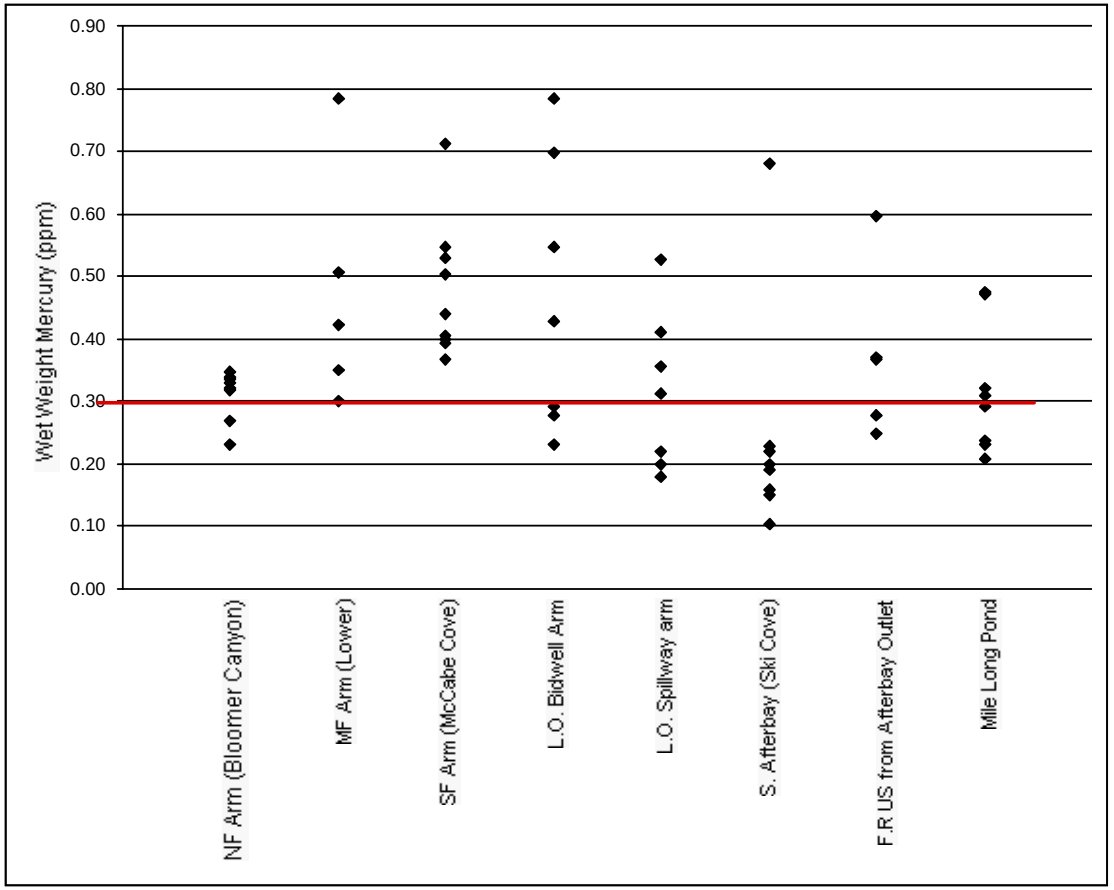
SPW2. Contaminant Accumulation in Fish, Sediments, and the Aquatic Food Chain

- Phase 1. Metals and organic contaminant assessment in project area

- Phase 2. Metals and organic contaminant sources and pathways assessment

SPW2. Contaminant Accumulation in Fish, Sediments, and the Aquatic Food Chain

- Phase 1. Tissue Mercury Results - April 2003



SPW2. Contaminant Accumulation in Fish, Sediments, and the Aquatic Food Chain

- Phase 2
  - Task 1 - Tributary assessment to determine role of project waters in bioaccumulation
  - Task 2 - Project waters assessment- species affected
  - Task 3 - Lower Feather River Assessment - significance of contamination in lower river

SPW2. Contaminant Accumulation in Fish, Sediments, and the Aquatic Food Chain

- **Phase 2 Assessment**
  - Environmental Workgroup Task Group - May 2003
    - SWRCB
    - NOAA Fisheries
    - OEHHA
    - DWR

SPW2. Contaminant Accumulation in Fish, Sediments, and the Aquatic Food Chain

	trout (1)	bass (1) (or pikeminnow)	coho (1,2)	catfish (1,5)	carp (1)	bullhead (1)	sunfish (6) (bluegill, redear sunfish, crapp
Upper tributaries							
West Branch	5	5					x
North Fork	5	5					x
Middle Fork	5	5					x
South Fork	5	5					x
Lake Oroville							
NF Arm (3)		5	5	5			x
MF Arm (3)		5	5	5			x
SF Arm (3)		5	5	5			x
Main body (3)		5	5	5			x
Thermalito Afterbay (3)		5			5		x
Mile Long Pond (3)		5			5	5	x
Feather River (4)		10			10		x

1 Five fish individually analyzed
2 Keep any chinook caught
3 One representative site
4 Sample reach between Afterbay Outlet and Honcut C
5 Keep any white catfish caught as well
6 Keep where caught - up to 20 of each species; okay to collect 10 from one site and 10 from another in L. Oroville
Discuss sunfish compositing with Margy Gassel prior to lab submittal

SPW2. Contaminant Accumulation in Fish, Sediments, and the Aquatic Food Chain

	trout (1)	bass (1) (or pikeminnow)	coho (1,2)	catfish (1,5)	carp (1)	bullhead (1)	sunfish (6) (bluegill, redear sunfish, crapp
Upper tributaries							
West Branch	5	5					x
North Fork	5#	5-10 smallmouth (5 larger, 5 smaller) 5-1 spotted bass 1.5 lbs					none seen
Middle Fork	5-5 larger, 5 small	5-3 Pikeminnow, 3 sucker					none seen
South Fork	5-5 small	5-5 Pikeminnow, 2 Hardhead					none seen
Lake Oroville							
NF Arm (3)		5-5	5-2	5- 5 CC, 1 WC			x
MF Arm (3)		5-5	5	5-5			26 bluegill (see 6)
SF Arm (3)		5-5	5	5-5			2 Black Crappie
Main body (3)		5-5	5- 1	5-5*			5 Bluegill, 1 Warmouth
Thermalito Afterbay (3)		5-5			5-5		3 Bluegill, 2 Redear
Robinson Pond (3)		10		10 suckers	2		
Mile Long Pond (3)		5-5			5-5	5-1	20 redear
Feather River (4)		10			10		x

* One is small 10 oz

Red indicates what we have

\# no trout seen in this lower stretch (NR Poe PH)- suggest we sample for trout farther upstream

1 Five fish individually analyzed
2 Keep any chinook caught
3 One representative site
4 Sample reach between Afterbay Outlet and Honcut Creek
5 Keep any white catfish caught as well
6 Keep where caught - up to 20 of each species; okay to collect 10 from one site and 10 from another in L. Oroville
Discuss sunfish compositing with Margy Gassel prior to lab submitta


DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

SPW3. Recreational Facilities and Operations Effects on Water Quality

- **Task 1. Effects of Current Recreation Facilities and Operations**
  - **Task 1A. Identification of Potential Effects to Water Quality**
    - **April 24, 2003 Report**
  - **Task 1B. Monitoring for Potential Effects to Water Quality**
    - **Initiated Monitoring in May 2003**


DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

SPW6. Project Effects on Temperature Regime

- **Task 1. Thermal Regime of Project Waters**
- **Task 2. Project Effects on Water Temperatures Downstream from Oroville Dam**
- **Task 3. Project Effects on Temperature Compliance**
- **Task 4. Access to Cold Water Pool**
- **Task 5. Hatchery Effects on Temperature**
- **Task 6. Effects of Pump-back Operations**


DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

SPW7. Land and Watershed Management

- **Task 1. Effects from Ongoing Land Uses and Management**
  - **Task 1A. Identification of Potential Effects to Water Quality**
    - **April 25, 2003 Report**
  - **Task 1B. Monitoring of Potential Effects to Water Quality**
    - **Monitoring begun in May 2003**


DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

SPW9. Project Effects on Natural Protective Processes

- **Task 1. Riparian and Wetland Areas**
  - **Literature review to determine role of riparian areas on regulating water quality of adjacent rivers**

- **Task 2. Riffle Areas**
  - **Literature review for effects of riffles on protection and improvement of water quality**
  - **Monitor water quality in riffle gravels**
    - **Dissolved oxygen**
    - **Water temperature**
    - **Conductivity**
    - **pH**
    - **Ammonia**

Study Plan W5
Project Effects on Groundwater

Progress Summary
August 27, 2003

Jerry Boles & Ryan Martin
Northern District
California Department of Water Resources

SPW5. Project Effects on Groundwater

- Task 1
  - Phase 1. Assessment of Existing Groundwater Data
  - Phase 2. Groundwater Monitoring
- Task 2
  - Hyporheic Monitoring

SPW5. Project Effects on Groundwater

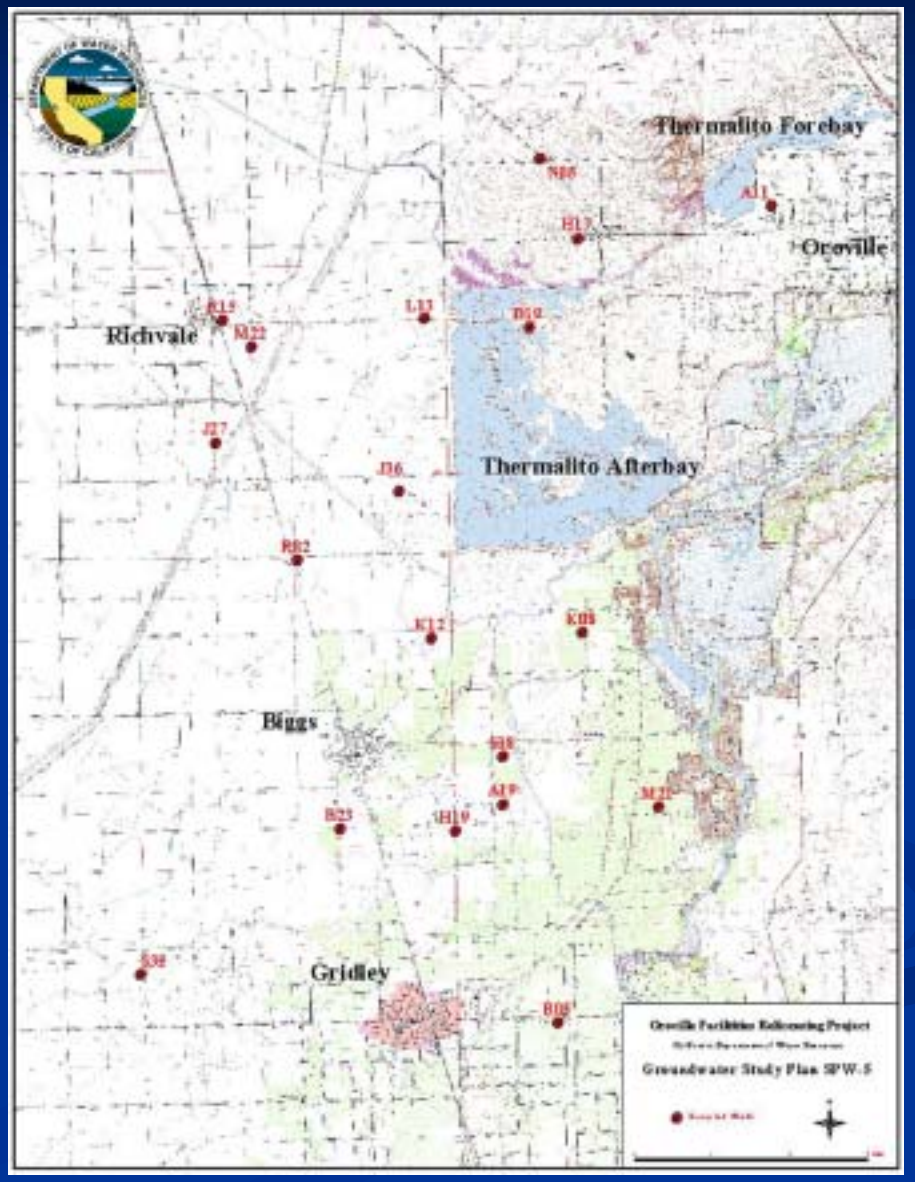
- Task 1, Phase 1. Assessment of Existing Groundwater Data
  - Report completed May 14, 2003
    - Groundwater levels monitored through extensive network
    - Little concern for groundwater levels
    - Little groundwater quality data being collected
    - Groundwater quality major local concern
    - Recommended additional groundwater monitoring
      - Phase 2

SPW5. Project Effects on Groundwater

- Task 1, Phase 2. Groundwater quality monitoring
  - Compared existing water quality data in Thermalito Forebay & Afterbay, Feather River, and groundwater
    - minerals, aluminum, mercury, physical parameters
  - Monitor in existing monitoring wells and piezometers
    - Many unsuitable
    - Identified 7 existing monitoring wells and 12 additional wells
    - Began monitoring in June 2003
    - Additional monitoring in October 2003

SPW5. Project Effects on Groundwater

- Task 1, Phase 2 - Monitoring Wells



SPW5. Project Effects on Groundwater

- Task 2 – Hyporheic Monitoring
  - Study Objectives
    - Determine hydraulic connectivity between the Feather River and ponds within the Oroville Wildlife Area
    - Identify extent to which Feather River influences water quality in Oroville Wildlife Area ponds

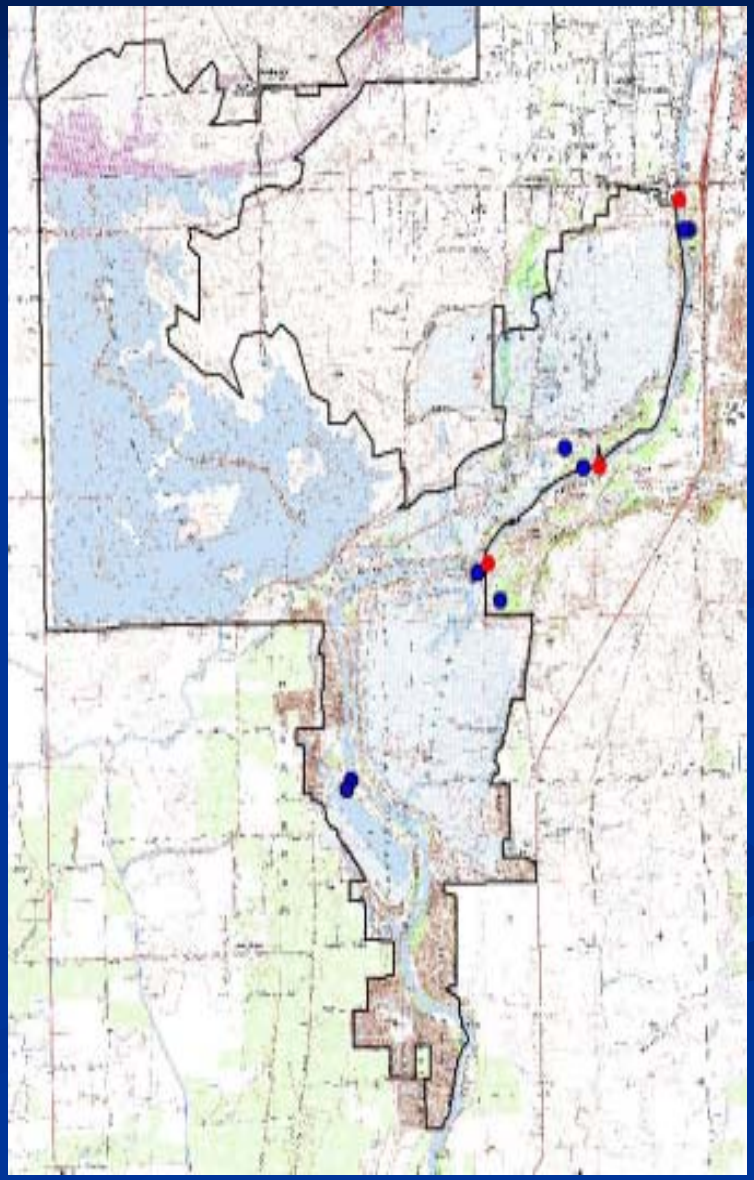
SPW5. Project Effects on Groundwater

- Task 2 – Hyporheic Monitoring
  - Study Plan
    - Install water level loggers in four OWA ponds
    - Survey in permanent monuments to establish elevation relationship between Feather River and ponds
    - Monthly WQ and temperature collection as part of SPW1

SPW5. Project Effects on Groundwater

Task 2 -Hyporheic Monitoring

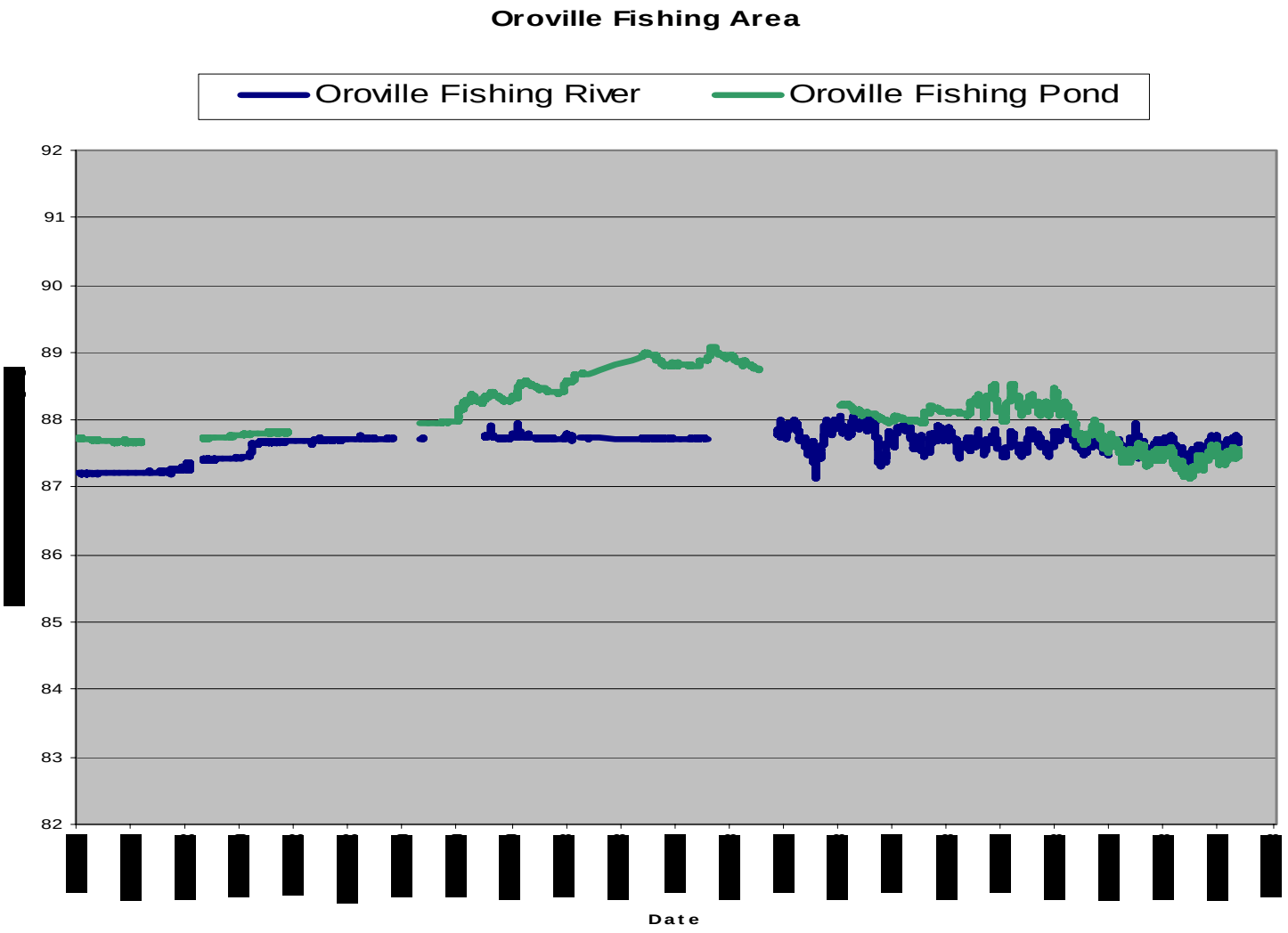
- Project Implementation
  - OWA Ponds selected for water level study
    - Oroville Fishing Pond (south pond)
    - Robinson Riffle Pond
    - Upper Pacific Heights Pond
    - Mile Long Pond



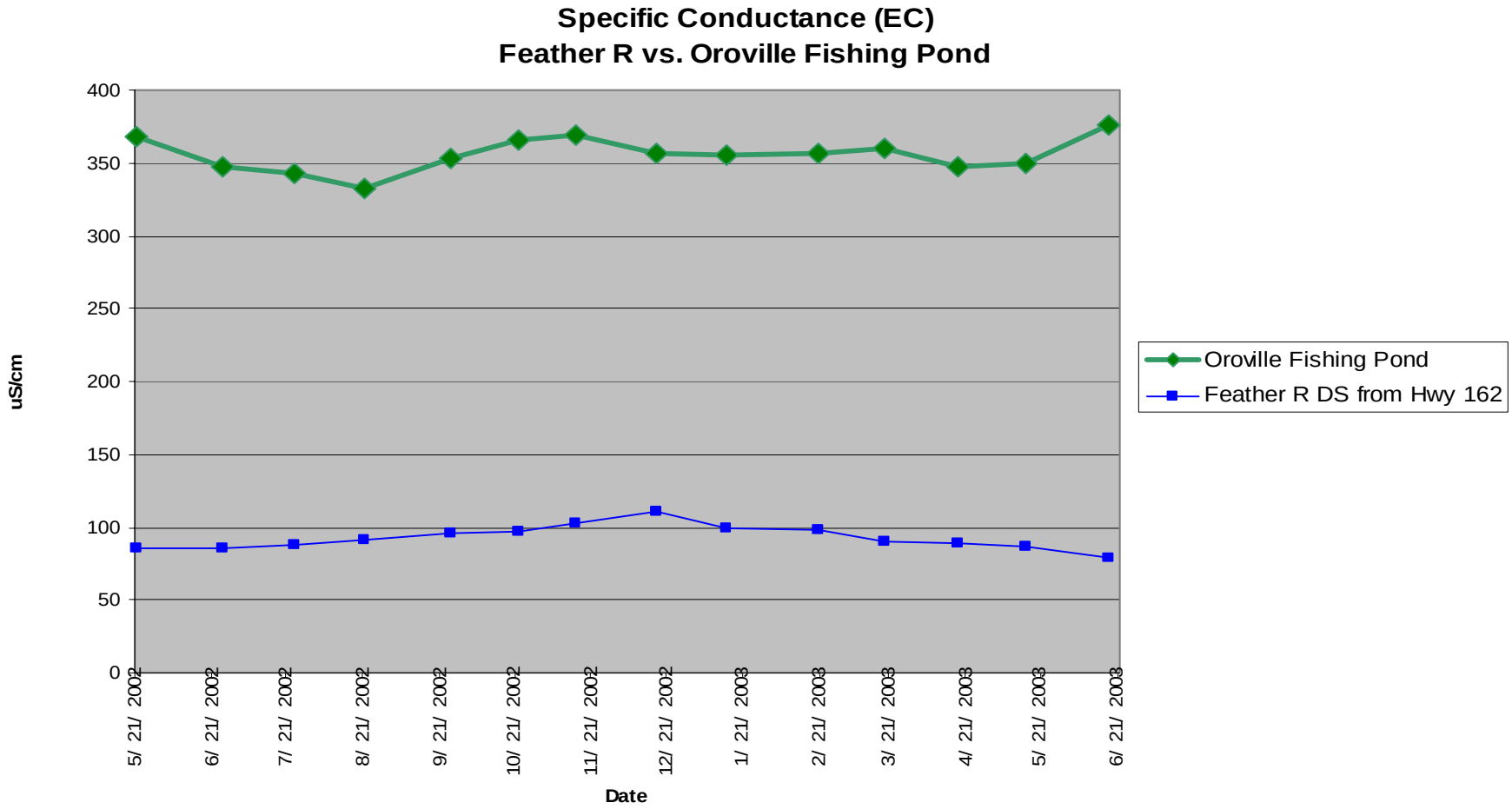
SPW5. Project Effects on Groundwater

- Task 2 – Hyporheic Monitoring
  - Results
    - Oroville Fishing Area

SPW5. Project Effects on Groundwater

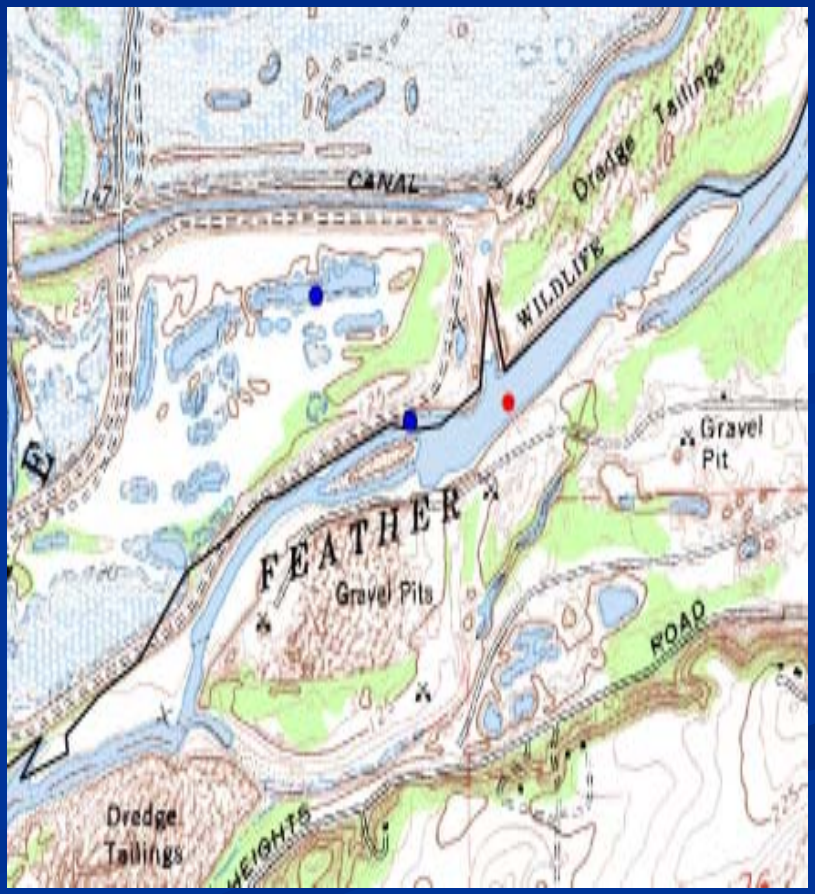


SPW5. Project Effects on Groundwater

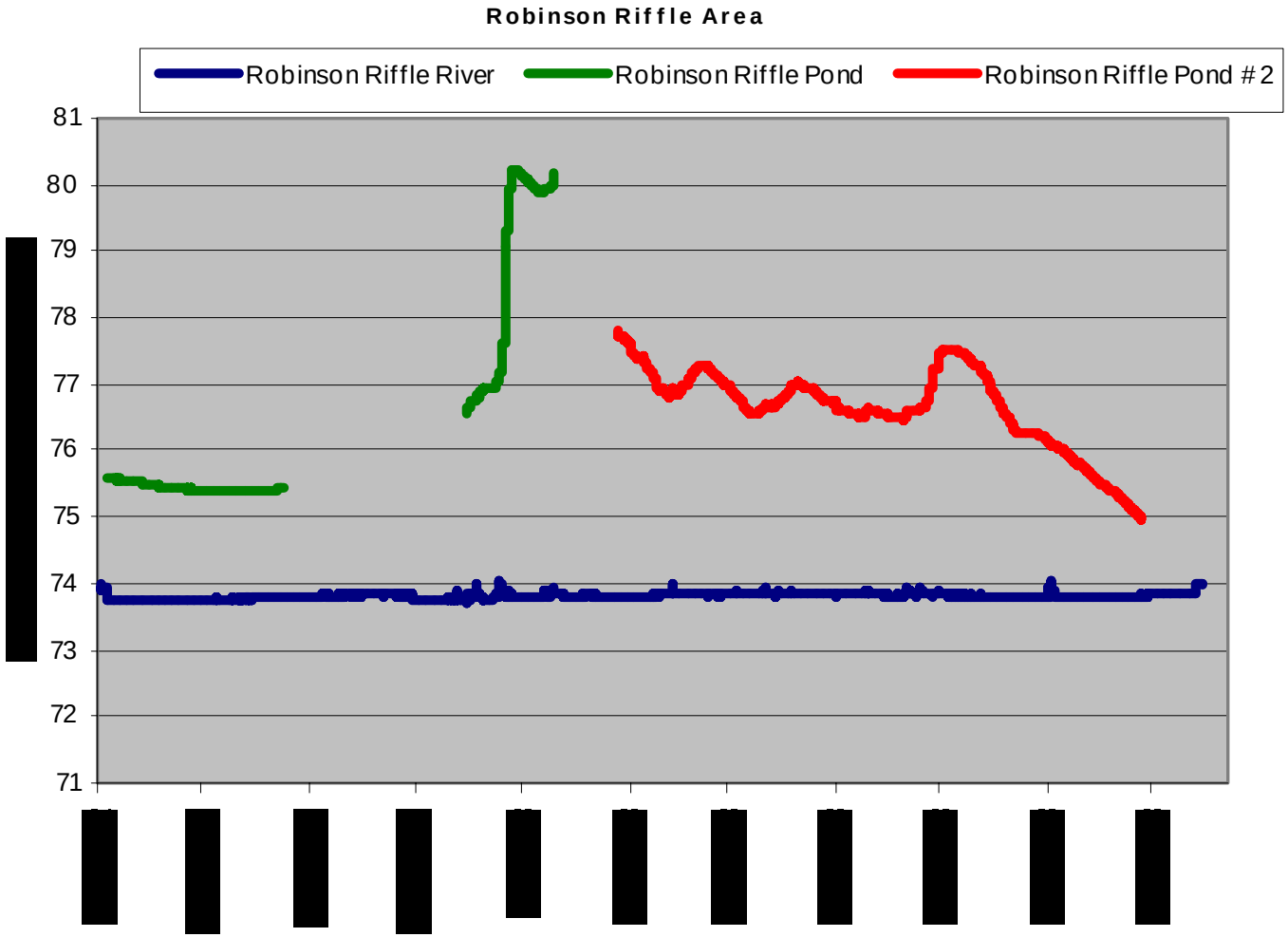


SPW5. Project Effects on Groundwater

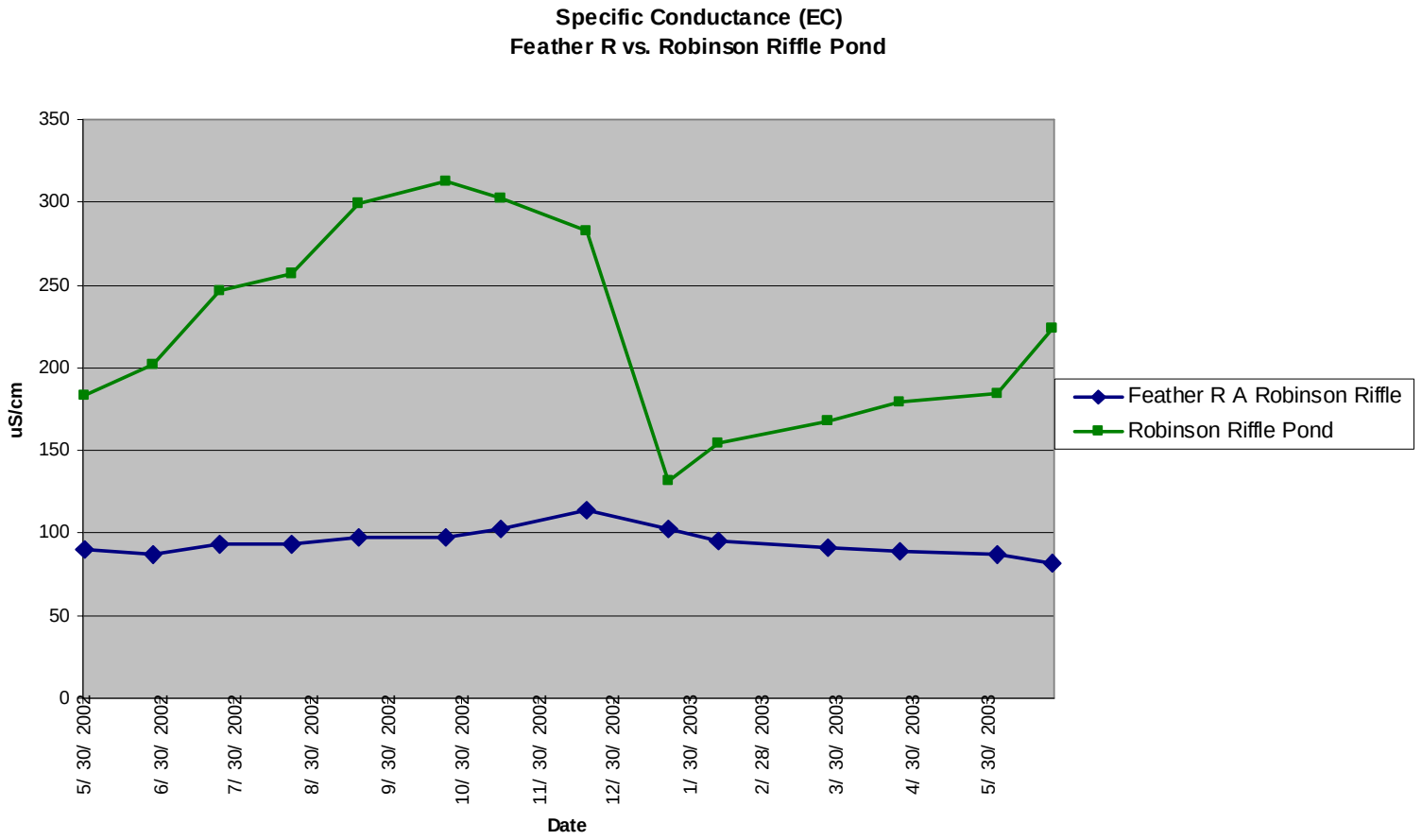
- Task 2 – Hyporheic monitoring
  - Results continued
    - Robinson Riffle Area



SPW5. Project Effects on Groundwater

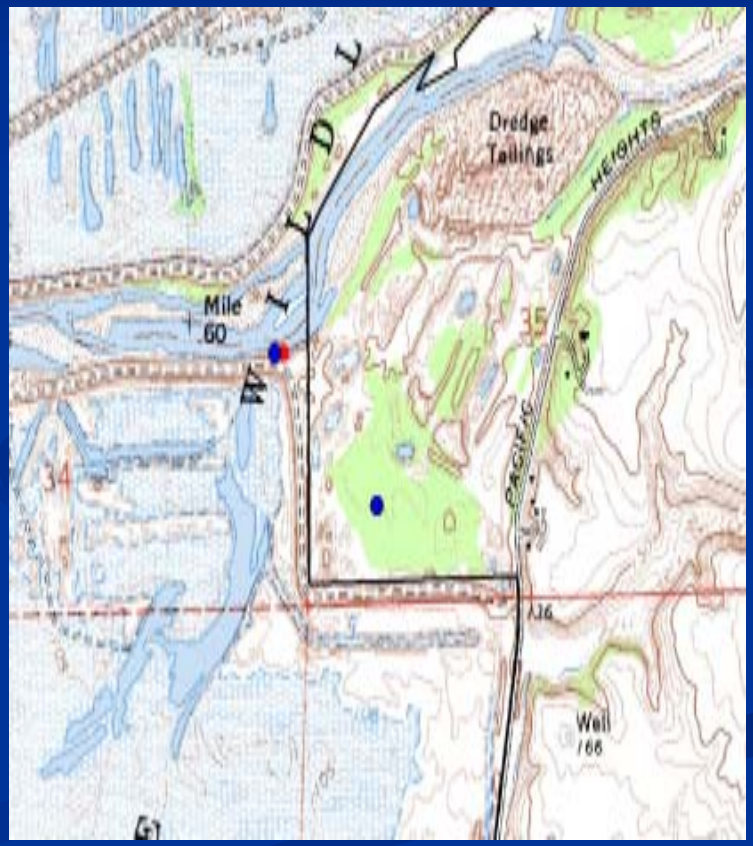


SPW5. Project Effects on Groundwater

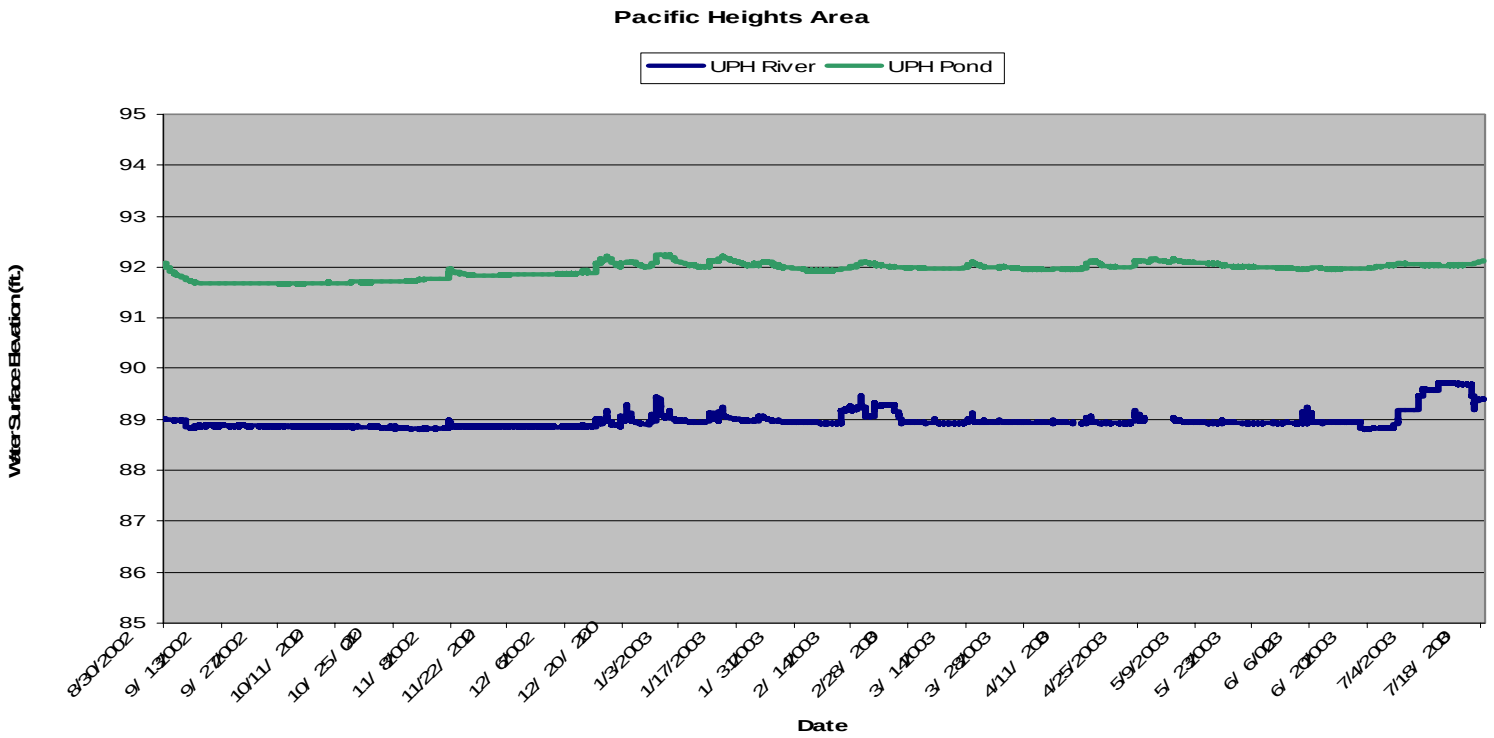


SPW5. Project Effects on Groundwater

- Task 2 – Hyporheic monitoring
  - Results continued
    - Upper Pacific Heights Pond



SPW5. Project Effects on Groundwater



SPW5. Project Effects on Groundwater

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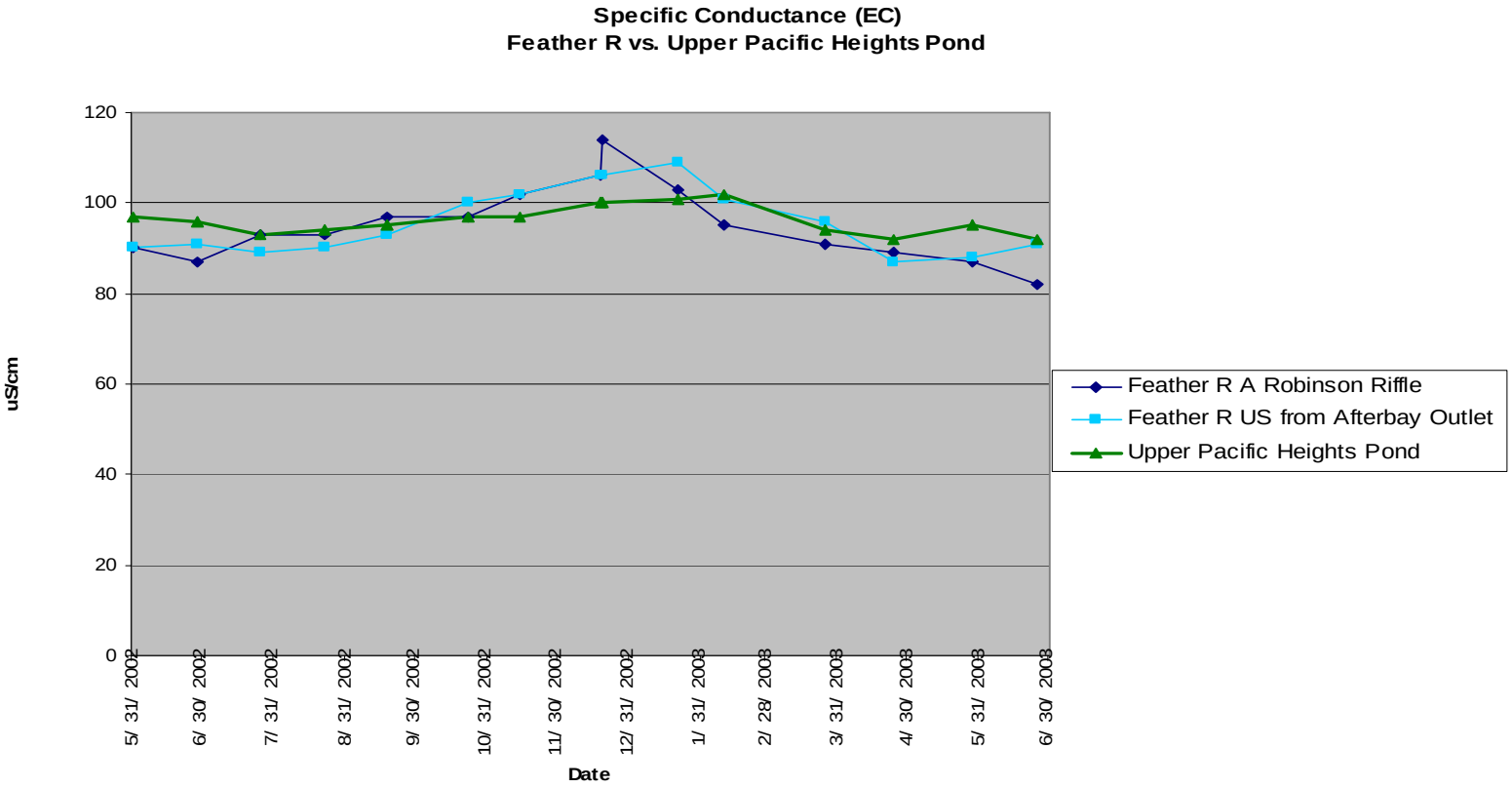
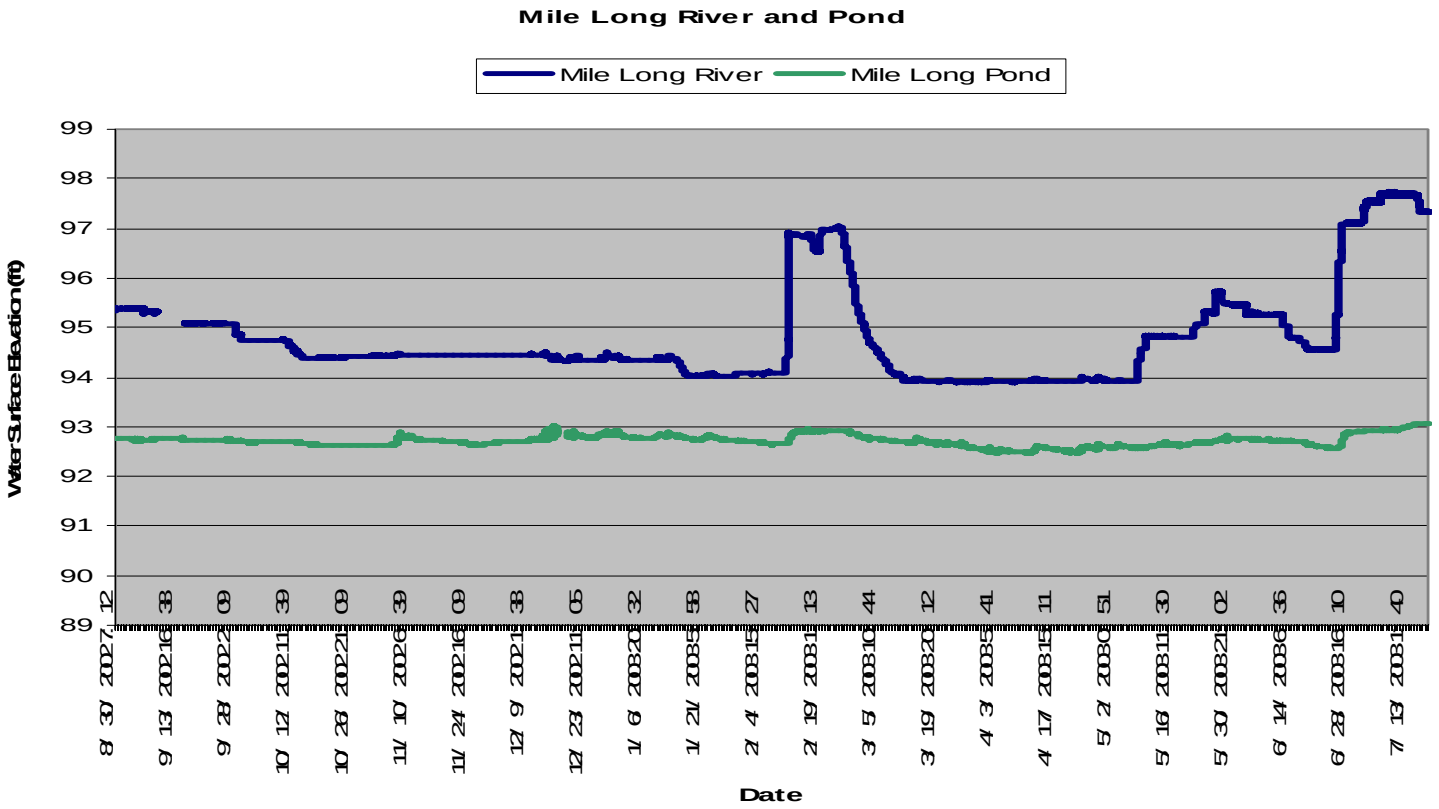


SPW5. Project Effects on Groundwater

SPW5. Project Effects on Groundwater

- Task 2 – Hyporheic monitoring
  - Results continued
    - Mile Long Pond

SPW5. Project Effects on Groundwater



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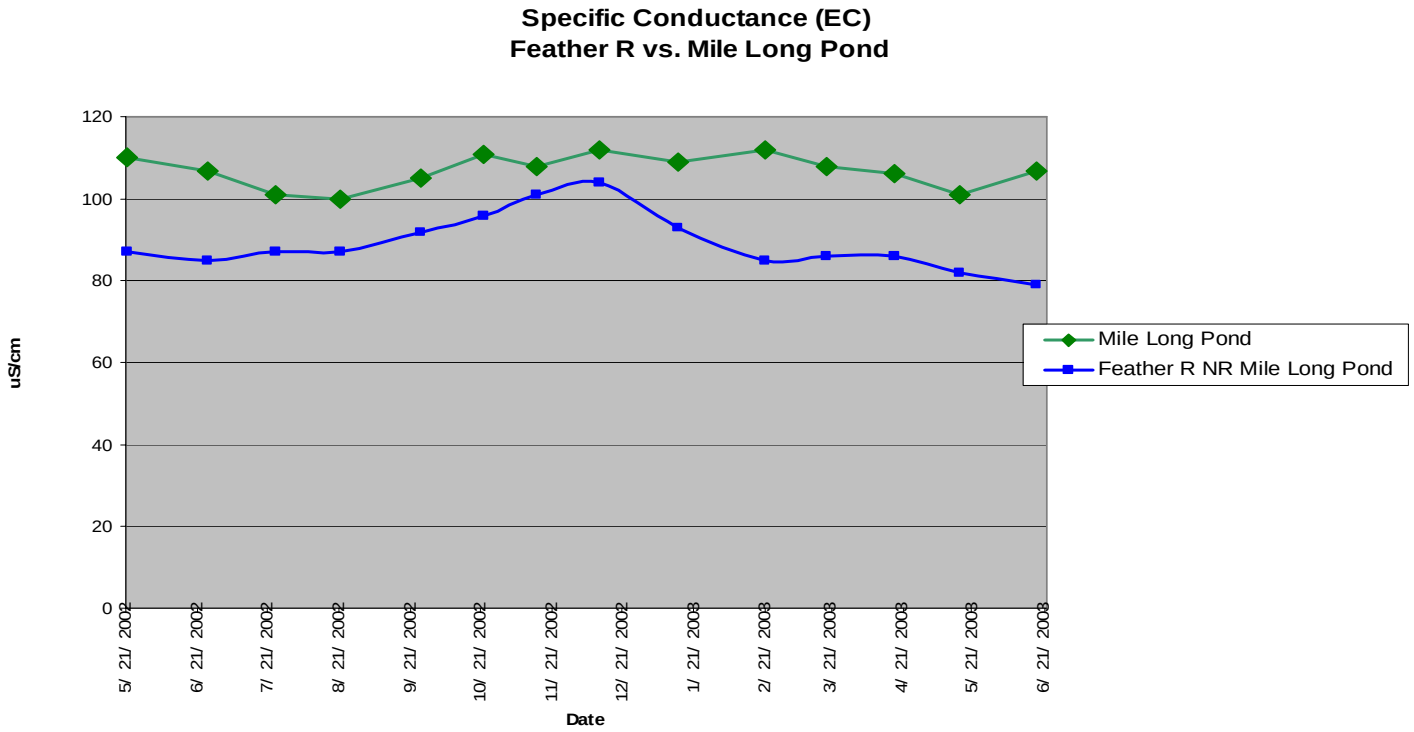

SPW5. Project Effects on Groundwater

- Task 2 – Hyporheic monitoring
  - Next Steps
    - Compare level logger data with rainfall totals
    - Analyze temperature data to see if any relationships exist
    - Select sample pond south of Mile Long Pond